UNCLASSIFIED

TECHNICAL MANUAL

for

LOW PASS FILTER

MODELS LPFA-1K, LPFA-10K

AND LPFA-40K

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

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IN 8017A

ISSUE DATE: 10 May 1967

NOTICE

THE TECHNICAL MATERIEL CORPORATION
COMMUNICATIONS ENGINEERS
700 FENIMORE ROAD MAMARONECK, N. Y.

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes*furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By

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LIST OF ILLUSTRATIONS

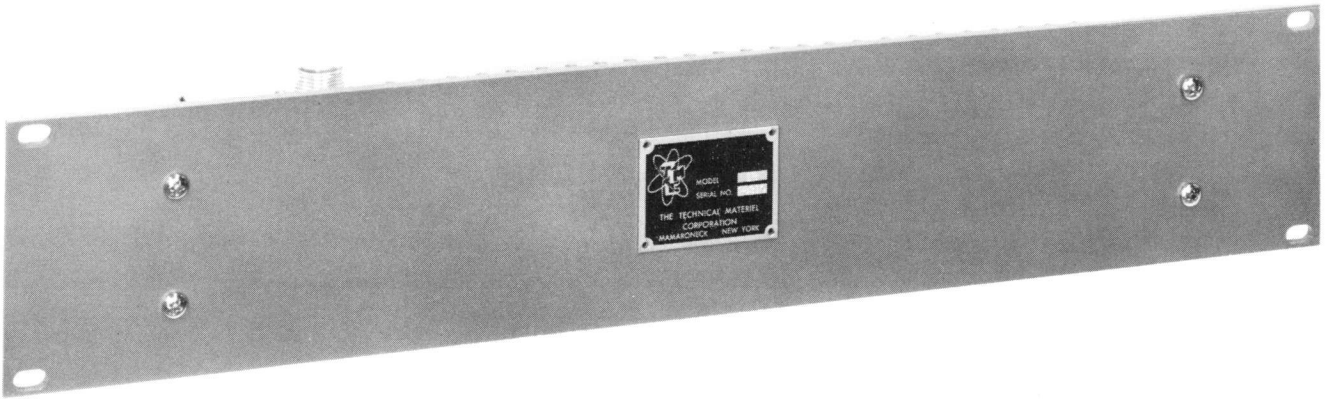

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Figure 1-1. Low Pass Filter, LPFA-1K, Front Angle View

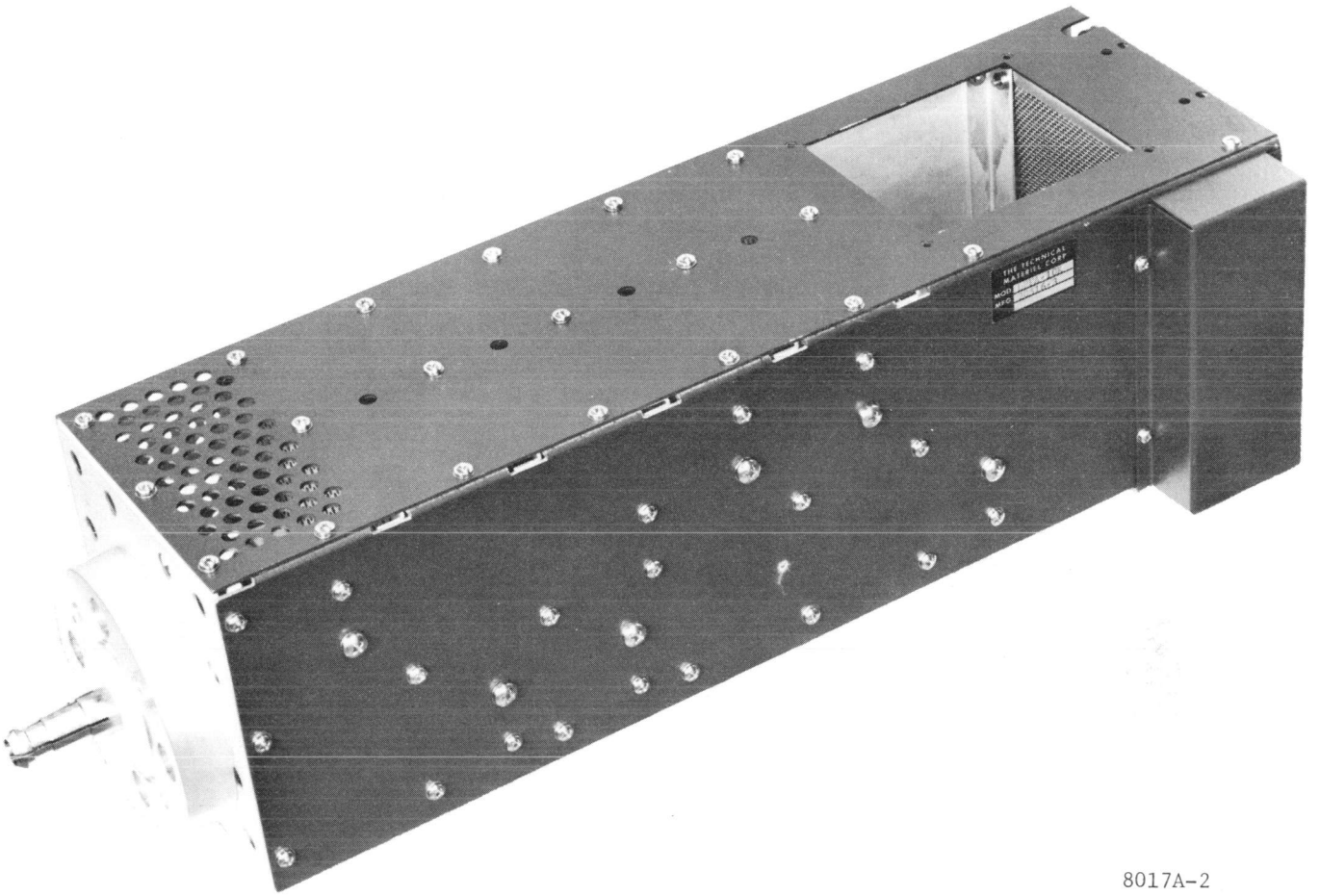

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Figure 1-2. Low Pass Filter, LPFA-10K, Front Angle View

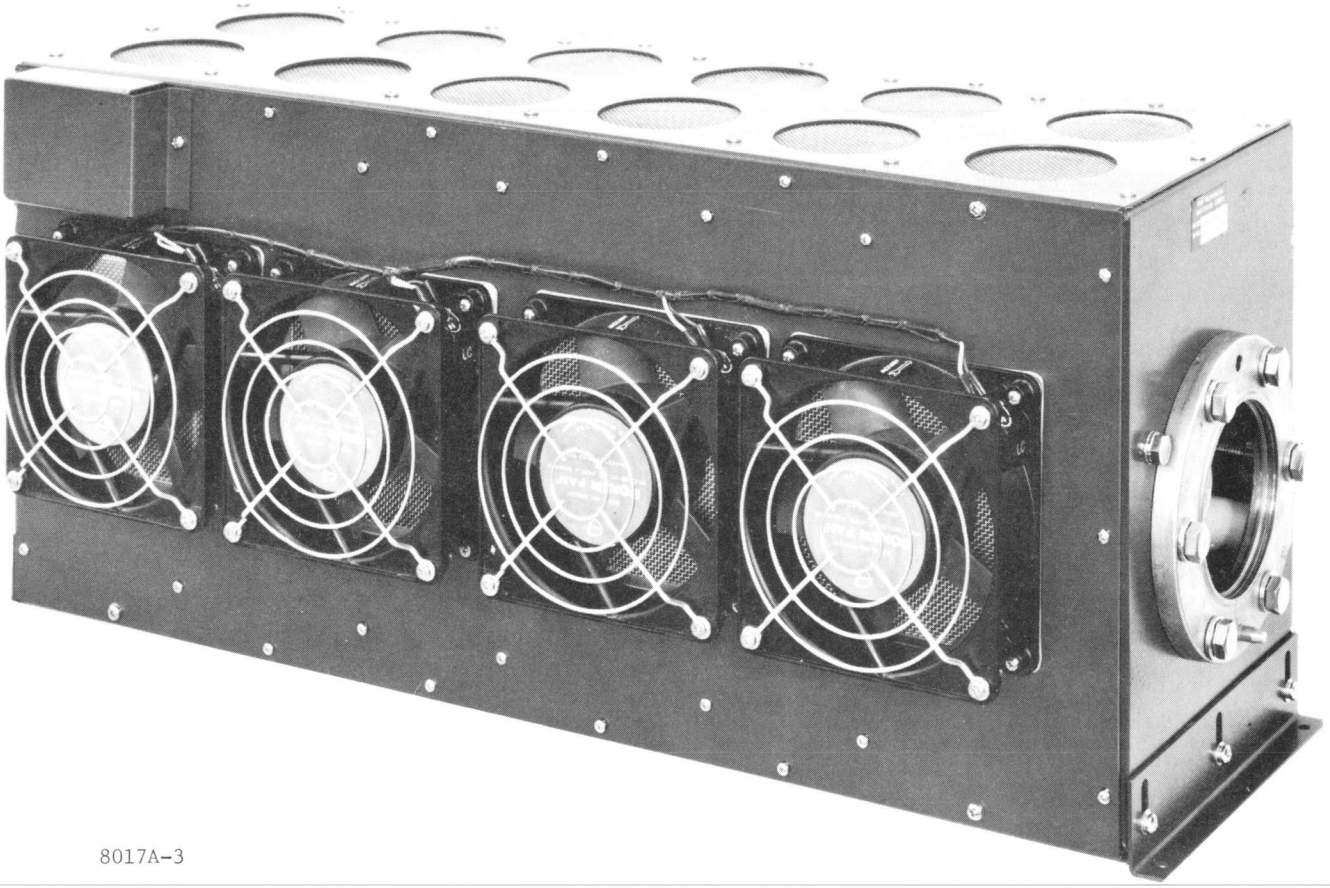

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Figure 1-3, Low Pass Filter - LPFA-40K, Front Angle View

SECTION 1
GENERAL INFORMATION

1-1. GENERAL

The Low Pass Filters, model numbers LPFA-1K, LPFA-10K, and LPFA-40K (Figures 1-1, 1-2 and 1-3) are capacitive inductive devices that are designed to attenuate harmonics and spurious emissions above 32 MHz.

The LPFA series of filters has a passband of 2-30 MHz without appreciable loss provided the transmission line is properly terminated.

The LPFA-10K and 40K filters are air cooled by fans, which keep internal components from overheating.

The LPFA-1K and 10K use the standard CC-109 capacitor series, while the 40K uses vacuum type capacitors.

1-2. TECHNICAL SPECIFICATIONS

INSERTION LOSS:	Nominally less than 0.25 DB (See chart below).
PASS BAND:	2 - 30 mcs (MHz).
FREQUENCY CUTOFF:	32 mcs (MHz) nominal.
REJECTION:	Rejection of unwanted r-f energy commences at 32 mcs (MHz) and will be reduced at least 60 DB below that provided by the tuning circuits of the transmitter at 40 mcs (±1 mc) and beyond.
INPUT AND OUTPUT IMPEDANCE:	50 ohm nominal. Unit will operate at rated power under VSWR conditions up to 2.5:1.

INSTALLATION INFORMATION:

1. LPFA-1K	Size: 2 1/2" x 2 1/2" x 15" mounted on 3 1/2" x 19" panel, Weight: 8 lbs.
2. LPFA-10K	Size: 18" x 5", Weight: 19 lbs.
3. LPFA-40K	Size: 23" x 7" x 10", Weight: 27 lbs.

ORDERING INFORMATION:

1. LPFA-1K	1 kw unit provided with standard N type r-f fittings.

1-2. TECHNICAL SPECIFICATIONS, (CONT).

2. LPFA-10K	10 kw unit with 1 5/8" EIA flange.
3. LPFA-40K	40 kw units have 3 1/8" EIA flange.
COMPONENTS AND CONSTRUCTION:	All equipment manufactured inaccordance with JAN/MIL specification wherever practicable.

SPECIFICATIONS: LPFA-10K FAN PART NUMBER BL106-6

100 CFM	Free delivery
IMPEDANCE	Protected
NO LUBRICATION	
VOLTAGE	208/230VAC 50/60 cps single phase
POWER	14 watts
LIFE	72°C 25,000 hrs. 25°C 90,000 hrs.
MOTOR BEARING	Sleeve
VENTURI BLOCK	Black phenolic or diecast zinc.
TERMINALS	Solder type to accomodate plug and cord.

LPFA-40K FAN PART NUMBER BL106-5
(Same as BL106-6 except:)

MOTOR BEARING:	Ball bearing
VOLTAGE:	115 VAC 50/60 cps 1 phase
TEMP RANGE:	32° to 80°C.
LIFE:	80°C 25,000 hrs.

SECTION 2
INSTALLATION

2-1. INITIAL INSPECTION

Each Low Pass Filter, LPFA-1K, 10K, and 40K is tested and inspected at the factory prior to shipment. Upon receipt of the unit, inspect it for possible damage, and the packing materials for parts which may have been shipped as loose items.

With respect to damage of the equipment for which the carrier is liable, the TECHNICAL MATERIEL CORPORATION will assist in describing methods of repair and the furnishing of replacement parts.

2-2. INSTALLATION

The LPFA-1K is mounted on a standard 19 inch front panel. The unit can easily be installed in any standard rack, by first connecting the filter input and output jacks, and then securing the front panel to the rack with four screws.

Refer to (figure 2-1 and 2-2) for typical installations of the LPFA 10K and 40K filters.

2-3. ELECTRICAL CONNECTIONS

The filters should be connected in the transmission line as shown by (figure 2-1 and 2-2). The input and output connections to the filter can be as desired since they are non directional. When the units are properly mounted the proper mating plug for input and output connections should be connected to the filter.

The fan in the LPFA-10K should be connected to a 208/230 vac 50/60 cps single phase source.

The fans in the LPFA-40K must be connected to 115 vac 50/60 cps single phase source.

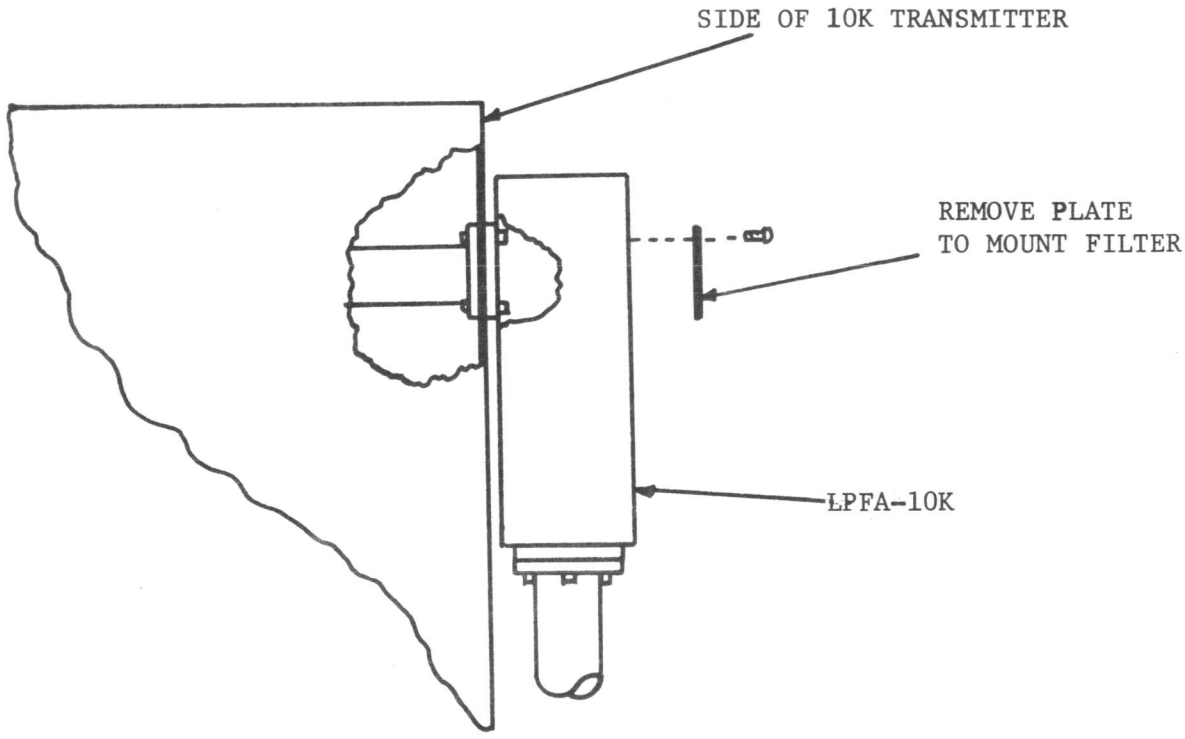

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Figure 2-1. Typical LPFA-10K Installation

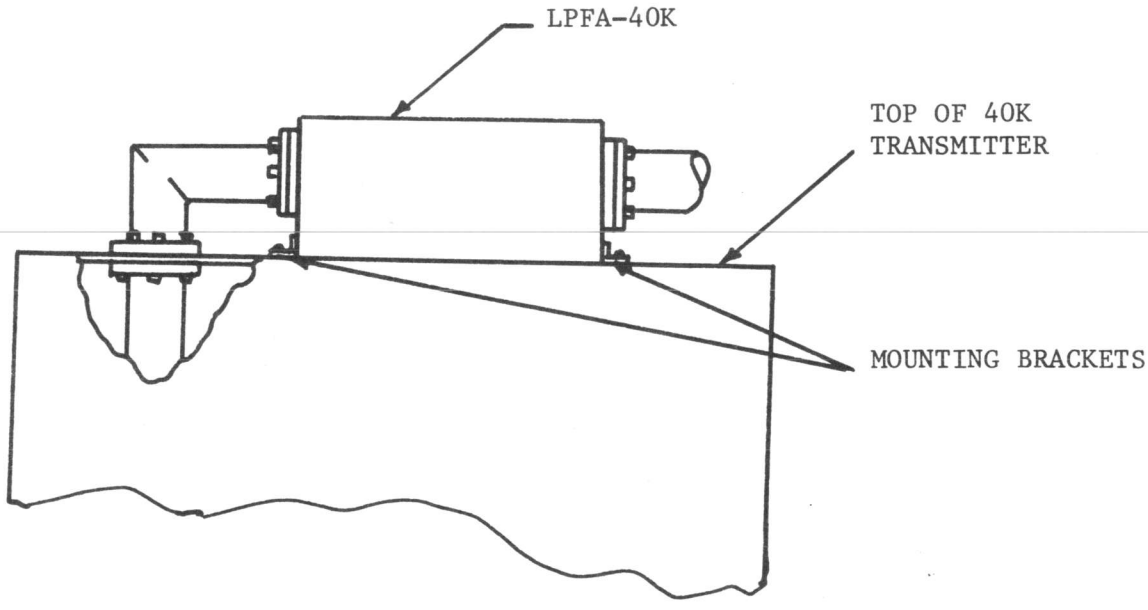

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Figure 2-2. Typical LPFA-40K Installation

SECTION 3
OPERATOR'S SECTION

3-1. OPERATION

Once units are properly installed, they are ready for operation. No operating instructions are needed.

SECTION 4
PRINCIPLES OF OPERATION

4-1. CIRCUIT DESCRIPTION

See (figures 7-1, 7-2, 7-3) for schematic diagrams of LPFA-1K, 10K and 40K filters. The filters basically consist of a series of constant K sections between two M derived end sections.

The two M derived end sections determine the ratio of cut off frequency to frequency of high attenuation. The constant K section determines the frequency passband and input output impedance of the filter.

SECTION 5
MAINTENANCE

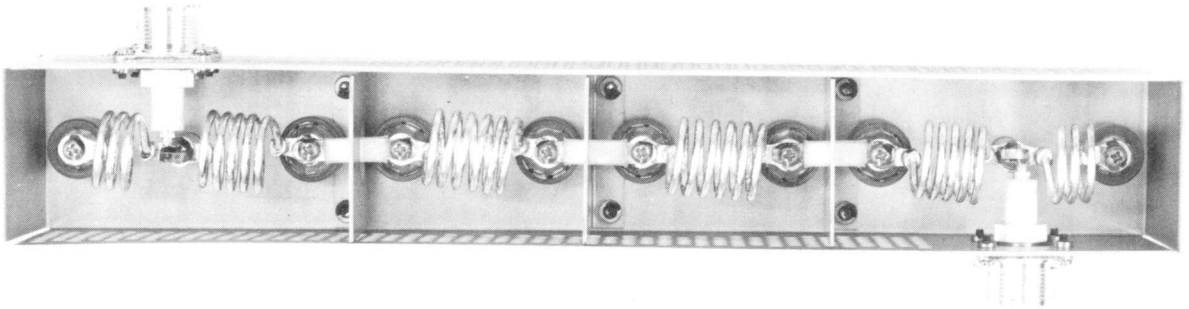
5-1. PREVENTIVE MAINTENANCE

a. Low Pass Filters LPFA 1K,10K and 40K have been designed to provide long term troubles-free operation under continuous duty conditions. However, in order to prevent failure of the equipment due to corrosion, dust, or other destructive elements, it is suggested that a schedule of preventive maintenance be set up and adhered to.

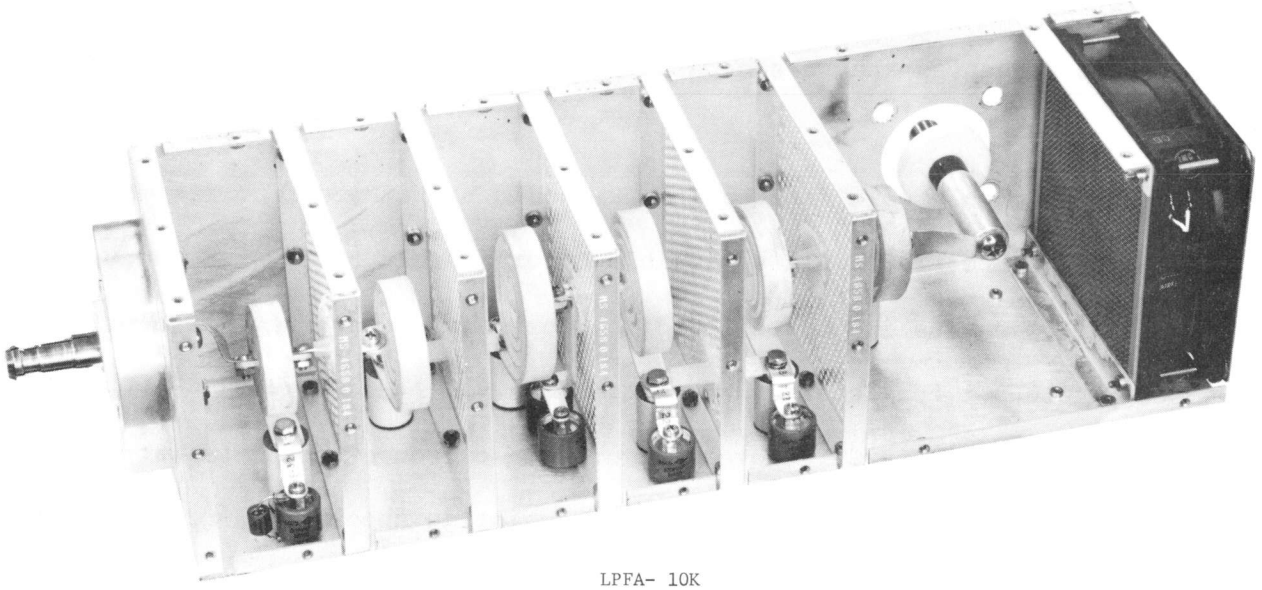
b. At periodic intervals, the equipment should be removed from its mounting for cleaning and inspection. All accessible covers should be removed and the wiring and all components inspected for dirt, corrosion, charring, discoloring or grease (see figure 5-1 for location of major components). Remove dust with a soft brush or vacuum cleaner. Remove dirt or grease from other parts with any suitable cleaning solvent. Use of carbon tetrachloride should be avoided due to its highly toxic effects. Trichlorethylene or methyl chloroform may be used, providing the necessary precautions are observed.

NOTE

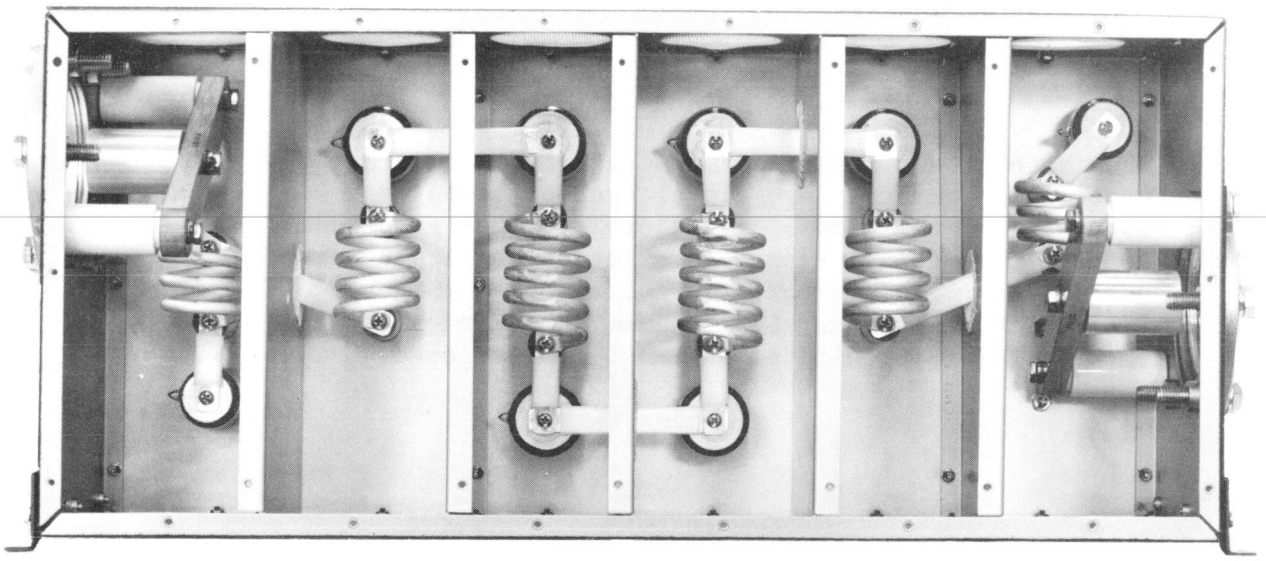
When using toxic solvents, make certain that adequate ventilation exists. Avoid prolonged or repeated breathing of the vapor. Avoid prolonged or repeated contact with skin. Flammable solvents shall not be used on energized equipment or near any equipment from which a spark may be received. Smoking, "hot work", etc. is prohibited in the immediate area.



LPFA- 1K



LPFA- 10K



LPFA-40K

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Figure 5-1. Internal Views of Filters Showing Components.

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SECTION 6
PARTS LIST

6-1. INTRODUCTION

The parts list presented in this section is a cross-reference list of parts identified by a reference designation and TMC part number. In most cases, parts appearing on schematic diagrams are assigned reference designations in accordance with MIL-STD-16. Wherever practicable, the reference designation is marked on the equipment, close to the part it identifies. In most cases, mechanical and electro-mechanical parts have TMC part numbers stamped on them.

To expedite delivery when ordering any part, specify the following:

a. Reference symbol.

b. Description as indicated in parts list.

c. TMC part number.

d. Model and serial numbers of the equipment containing the part being replaced; this can be obtained from the equipment nameplate.

For replacement parts not covered by warranty (refer to warranty sheet in front of manual), address all purchase orders to:

The Technical Materiel Corporation
Attention: Sales Department
700 Fenimore Road
Mamaroneck, New York

PARTS LIST

for

LOW PASS FILTER, MODEL LPFA-1K

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
C1	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 25 uuf, ±10%; 7,500 WVDC.	CC109-13
C2	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100 uuf, ±10%; 5,000 WVDC.	CC109-28
C3 thru C7	Same as C2.	
C8	Same as C1.	
C9	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 5 uuf, ±10%; 5,000 WVDC.	CC109-3
C10	Same as C9.	
J1	CONNECTOR, RECEPTACLE, ELECTRICAL: series HN.	UG560*/U
J2	Same as J1.	
L1	COIL, RADIO FREQUENCY	CL401-1
L2	COIL, RADIO FREQUENCY	CL401-2
L3	COIL, RADIO FREQUENCY	CL401-3
L4	Same as L3.	
L5	Same as L2.	
L6	Same as L1.	

PARTS LIST

for

LOW PASS FILTER, MODEL LPFA-10K

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
B400	FAN, VENTILATING: 208/230 V, 50/60 cps; single phase; 100 CFM free delivery.	BL106-6
C400	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 50 uuf, ±10%; 7,500 WVDC.	CC109-21
C401	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10 uuf, ±10%; 5,000 WVDC.	CC109-5
C402	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 100 uuf, ±10%; 5,000 WVDC.	CC109-28
C403 thru C407	Same as C402.	
C408	Same as C400.	
C409	Same as C401.	
CP400	CONNECTOR, PLUG, ELECTRICAL: 50 ohms; brass. (Supplied as Loose Item)	PO218-50
J400	ADAPTER, CONNECTOR, ELECTRICAL: 50 ohms.	PM710-1
L400	COIL, RADIO FREQUENCY: fixed; .26 uh, ±3%; silver plated copper.	CL381
L401	COIL, RADIO FREQUENCY: fixed; .4 uh, ±3%; silver plated copper.	CL382
L402	COIL, RADIO FREQUENCY: fixed; .5 uh, ±3%; silver plated copper.	CL383
L403	Same as L402.	
L404	Same as L401.	
L405	Same as L400.	
P400	PLATE, ADAPTER, ELECTRICAL: 3/4" thk. x 4"dia.	PM708
TB400	TERMINAL BOARD, BARRIER: four 6-32 thd. x 1/4" long binder head machine screws; black phenolic body.	TM102-4

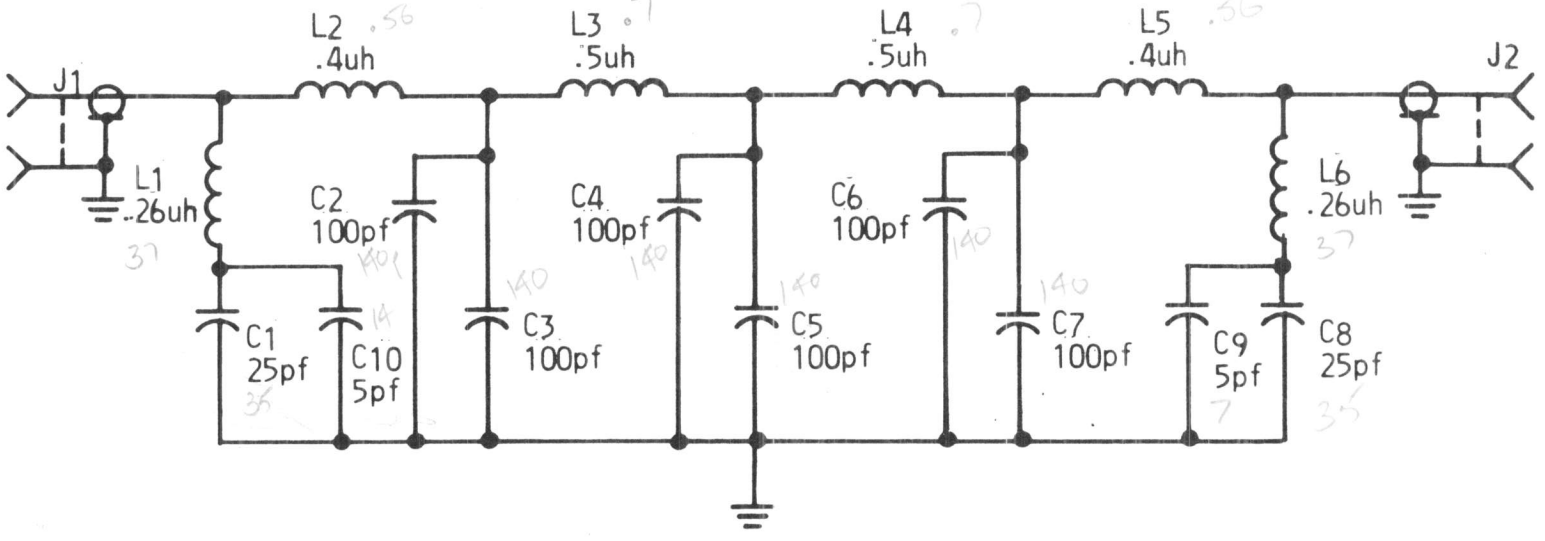
PARTS LIST

for

LOW PASS FILTER, MODEL LPFA-40K

REF SYMBOL	DESCRIPTION	TMC PART NUMBER
B1	FAN, VENTILATING: 115 VAC, 50/60 cps, single phase; power rating 14 watts; 100 CFM free delivery.	BL106-5
B2 thru B4	Same as B1.	
C1	CAPACITOR, FIXED, VACUUM: 60 uuf; current rating 30 A RMS; voltage rating 7.5 KV peak.	CO112-60
C2	CAPACITOR, FIXED, VACUUM: 100 uuf; current rating 30 A RMS; voltage rating 7.5 KV peak.	CO112-100
C3 thru C7	Same as C2.	
C8	Same as C1.	
J1	ADAPTER, CONNECTOR, ELECTRICAL: consists of 1 each T.M.C. Part No's. PM727-1, PO223.	
J2	Same as J1.	
L1	COIL, RADIO FREQUENCY:.26 uh; 3 turns, CCW direction of winding.	CL417-1
L2	COIL, RADIO FREQUENCY: .33 uh; 4 turns, CW direction of winding.	CL417-2
L3	COIL, RADIO FREQUENCY: .42 uh; 5 turns, CCW direction of winding.	CL417-3
L4	Same as L3.	
L5	Same as L2.	
L6	Same as L1.	
TB1	TERMINAL BOARD, BARRIER: four 6-32 thd. x 1/4" long binder head machine screws; black phenolic body.	TM102-4

SECTION 7
SCHEMATIC DIAGRAMS



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Low Pass Filter LPFA-1K
Schematic Diagram

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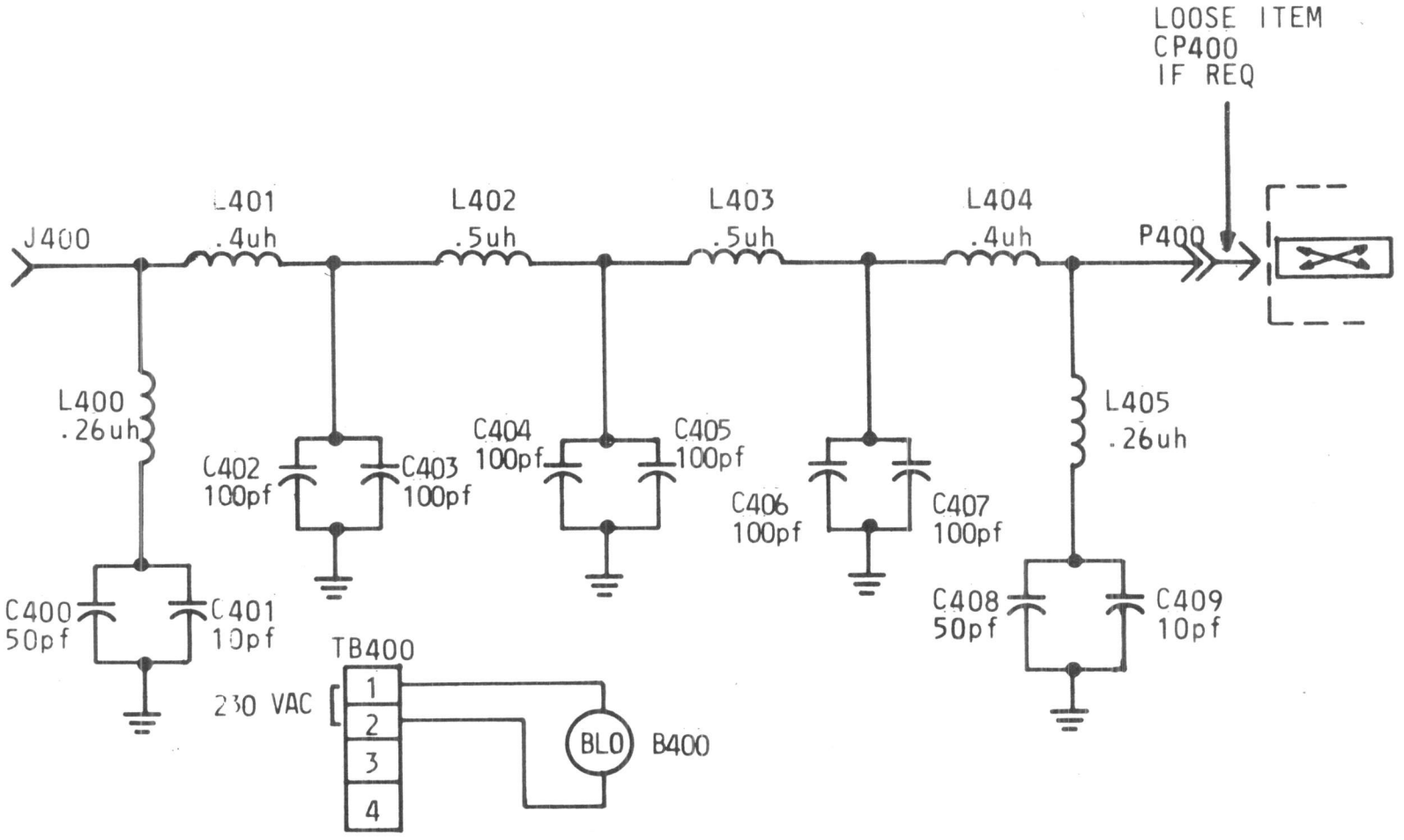
7-3/7-4



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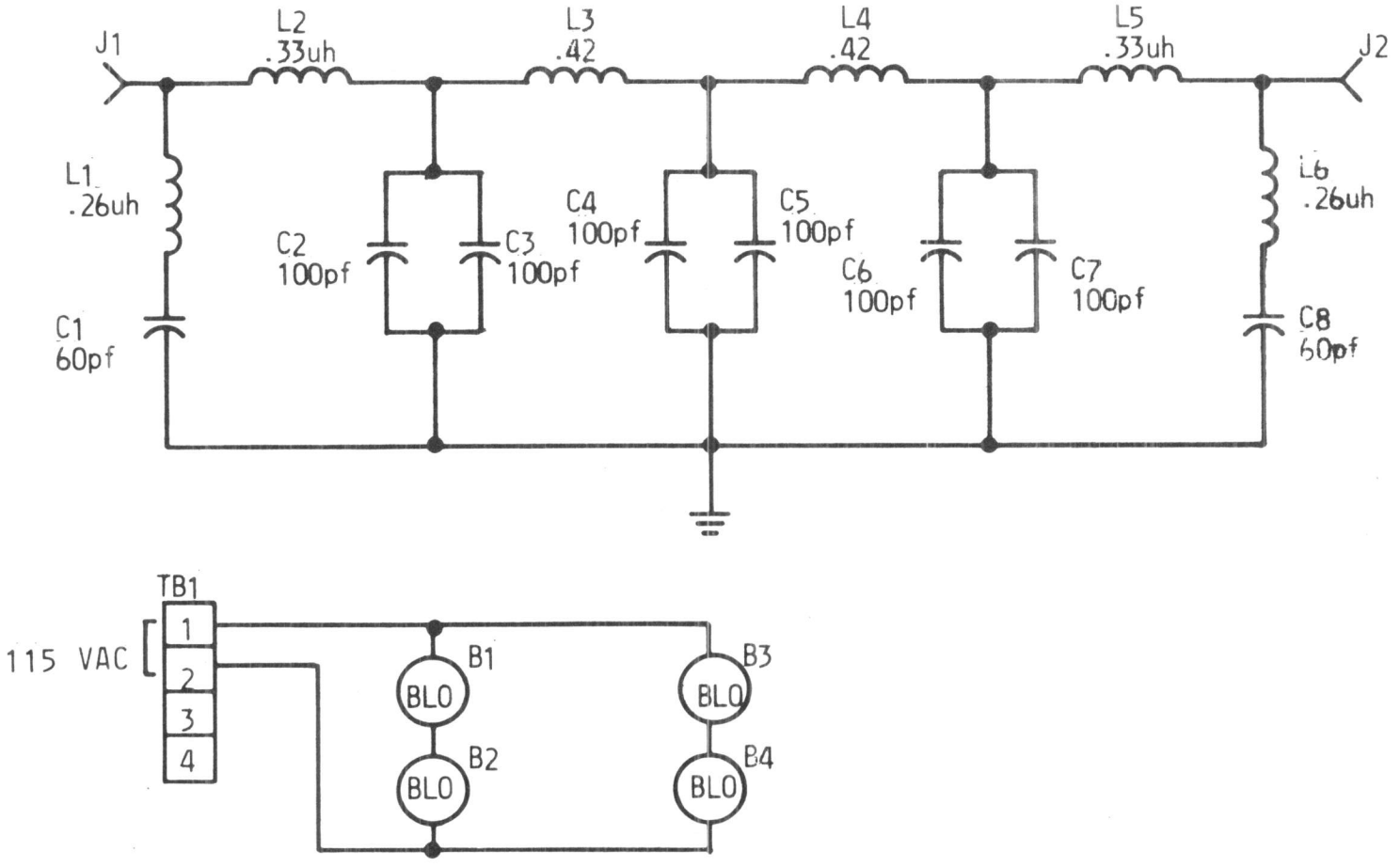
Low Pass Filter, LPFA-10K
Schematic Diagram



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Low Pass Filter, LPFA-40K
Schematic Diagram